

CLAIMS

1. A reception apparatus comprising:

an amplification section that carries out processing
5 of amplifying a received signal;

a frequency conversion section that carries out
processing of converting the frequency of the received
signal amplified by the amplification section from a radio
frequency to a baseband which is a lower frequency than
10 the radio frequency;

a gain control section that performs gain control
with such a gain that the received signal whose frequency
has been converted by the frequency conversion section
has predetermined reception quality;

15 a voltage calibration section that performs
calibration processing on an offset voltage of the
received signal generated when the gain control section
performs gain control;

a time constant control section that sets a first
20 time constant during a reception operation and sets a
second time constant which is reduced from the first time
constant when the calibration processing is carried out
by the voltage calibration section;

a filter section that lets pass the received signal
25 of a predetermined band with the first time constant or
the second time constant set by the time constant control
section; and

an operation control section that stops the operation of the amplification section that amplifies the received signal or the frequency conversion section that performs frequency conversion of the received signal during the calibration processing and controls the operation of the amplification section or the frequency conversion section so as to reduce the offset voltage caused by the switching of the operation of the amplification section or the frequency conversion section.

2. The reception apparatus according to claim 1, wherein:

the gain control section performs gain control in a plurality of stages so that the received signal has predetermined reception quality;

the voltage calibration section sequentially calibrates an offset voltage generated when the gain control section performs gain control for the each stage, in ascending order of the stages;

the filter section is provided for each of the stages and lets pass a received signal of a predetermined band with the first time constant or the second time constant for each of the stages; and

the time constant control section can set a time constant independently for each the filter section, sets the time constant of the filter section as the second

time constant before the calibration processing and changes at least one time constant of the filter section in the stage in which the calibration processing is completed and a stage ahead of the stage in which the calibration processing is completed, from the second time constant to the first time constant.

3. The reception apparatus according to claim 1, wherein:

10 the gain control section performs gain control in a plurality of stages so that the received signal has predetermined reception quality;

the voltage calibration section sequentially calibrates an offset voltage generated when the gain control section performs gain control for the each stage, in ascending order of the stages; and

the operation control section changes, after the calibration processing is completed in a switching stage which is the predetermined stage, the operation of the amplification section or the frequency conversion section from a stopped state to an operating state to thereby reduce the offset voltage.

4. The reception apparatus according to claim 3, wherein:

the filter section is provided for each the stage and lets pass the received signal of a predetermined band

for each stage with the first time constant or the second time constant; and

the time constant control section can set a time constant independently for each the filter section, sets
5 the time constant of the filter section as the second time constant before the calibration processing and changes, after the operation of the amplification section or the frequency conversion section is switched from a stopped state to an operating state, at least one time
10 constant of the filter section in the switching stage and a stage ahead of the switching stage, from the second time constant to the first time constant.

5. The reception apparatus according to claim 1,
15 wherein:

the amplification section is provided for each of received signals in a plurality of different bands and performs amplification processing for each of the bands; and

20 the operation control section stops, during the calibration processing on the offset voltage of the received signal whose frequency has been converted by the frequency conversion section, the operation of the amplification section used for amplification of the
25 received signal in the band being subjected to reception processing, performs switching so as to cause the amplification section used to amplify the received signal

in the band not being subjected to reception processing to operate and thereby reduces the offset voltage.

6. The reception apparatus according to claim 5,
5 wherein the operation control section causes the amplification section in the band not used in a proximity cell to operate during the calibration processing.

7. The reception apparatus according to claim 5,
10 further comprising a storage section that stores first selection information which associates the band with the amplification section,

wherein the operation control section selects the amplification section to be stopped and the amplification
15 section to be operated with reference to the first selection information using the information on the band reported from the other party of communication.

8. The reception apparatus according to claim 5,
20 further comprising a storage section that stores second selection information which associates position information with the band and the amplification section,

wherein the operation control section selects the amplification section to be stopped and the amplification
25 section to be operated with reference to the second selection information using the position information indicating the own position.

9. The reception apparatus according to claim 1,
wherein, when the gain under the gain control by the gain
control section is equal to or above a threshold, the
5 operation control section stops processing of at least
one of the amplification section and the frequency
conversion section when the voltage calibration section
calibrates the offset voltage of the received signal,
and, when the gain under the gain control by the gain
10 control section is below the threshold, the operation
control section performs switching so as to cause the
amplification section and the frequency conversion
section to operate when the voltage calibration section
calibrates the offset voltage of the received signal.

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10. The reception apparatus according to claim 1,
further comprising a detection section that detects the
level of reception power of the received signal whose
frequency has been converted by the high-frequency
20 processing section,

wherein when the level of reception power detected
by the detection section is equal to or above a threshold,
the operation control section stops processing of at least
one of the amplification section and the frequency
25 conversion section when the voltage calibration section
calibrates the offset voltage of the received signal and
when the level of reception power detected by the detection

section is below the threshold, the operation control section performs switching so as to cause the amplification section and the frequency conversion section to operate when the voltage calibration section
5 calibrates the offset voltage of the received signal.

11. A reception method comprising:

a step of performing processing of amplifying a received signal;

10 a step of performing processing of converting the frequency of the amplified received signal from a radio frequency to a baseband which is a lower frequency than the radio frequency;

a step of performing gain control with such a gain
15 that the received signal whose frequency has been converted has predetermined reception quality;

a step of performing calibration processing on an offset voltage of the received signal generated during gain control;

20 a step of setting a first time constant during a reception operation and setting a second time constant which is reduced from the first time constant during calibration processing;

a step of letting pass the received signal of a
25 predetermined band with the first time constant or the second time constant which has been set; and

a step of stopping the operation of amplifying the

received signal or the operation of frequency conversion of the received signal during the calibration processing and controlling the operation of the amplification processing or operation of performing the frequency conversion so as to reduce the offset voltage caused by switching the operation of amplifying the received signal or the operation of performing frequency conversion of the received signal.

10 12. A semiconductor integrated circuit apparatus comprising:

an amplification circuit that performs processing of amplifying a received signal;

15 a frequency conversion circuit that performs processing of converting the frequency of the received signal amplified by the amplification circuit from a radio frequency to a baseband which is a lower frequency than the radio frequency;

20 a gain control circuit that performs gain control with such a gain that the received signal whose frequency has been converted by the frequency conversion circuit has predetermined reception quality;

25 a voltage calibration circuit that performs calibration processing at an offset voltage of the received signal generated during gain control by the gain control circuit;

a time constant control circuit that sets a first

time constant during a reception operation and sets a second time constant which is reduced from the first time constant when the voltage calibration circuit carries out the calibration processing;

5 a filter circuit that lets pass the received signal of a predetermined band with the first time constant or the second time constant set by the time constant control circuit; and

 an operation control circuit that stops the
10 operation of the amplification circuit that amplifies the received signal or the frequency conversion circuit that performs the frequency conversion of the received signal during the calibration processing and controls the operation of the amplification circuit or the
15 frequency conversion circuit so as to reduce the offset voltage caused by stopping the operation of the amplification circuit or the frequency conversion circuit.